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Hyperthyroidism in Women: Clinical Manifestations, Symptoms, Management and Life Style Management

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HYPERTHYROIDISM:

Introduction:

The thyroid is a small, butterfly-shaped gland located at the front of your neck. It produces thyroxine (T4) and triiodothyronine (T3), which are two primary hormones that control how your cells use energy. Your thyroid gland regulates your metabolism through the release of these hormones.

Thyroid diseases are characterized by hyperfunction (hyperthyroidism), hypofunction (hypothyroidism) or inflammation (thyroiditis) of the thyroid gland or the presence of thyroid nodules, which can be benign or cancerous.All of these disorders can result in an enlarged thyroid gland that causes swelling of the neck, a so-called Goiter.

Hyperthyroidism can influence multiple organ systems, involving the cardiovascular, nervous, gastrointestinal, and hepatic systems.Hyperthyroidism can be overt or subclinical. Overt hyperthyroidism is defined as low or suppressed thyroid stimulating hormone (TSH) levels with elevated triiodothyronine (T3) levels and/or elevated thyroxine (T4) levels.

Hypothyroidism may not cause noticeable symptoms in its early stages. Over time, hypothyroidism that isn't treated can lead to other health problems, such as high cholesterol and heart problems.

Iodine deficiency early in life impairs cognition and growth, but iodine status is also a key determinant of thyroid disorders in adults. Severe iodine deficiency may causegoitre and hypothyroidism because, despite an increase in thyroid activity to maximise iodine uptake and recycling in this setting, iodine concentrations are still too low to enable production of thyroid hormone.

EPIDEMOLOGY:

The prevalence of spontaneous hypothyroidism is between 1 and 2%, and it is more common in older women and ten times more common in women than in men.

The prevalence of hyperthyroidism in women is between 0.5 and 2% and is ten times more common in women than in men. The Epidemiological studies suggest that 1% of men and 5% of women have thyroid nodules detected clinically and that the frequency increases with age and in iodine-deficient populations other risk factors associated with the development of hyperthyroidism include smoking, iodine deficiency, iodine excess, selenium deficiency, genetic factors, and the use of certain drugs.

This high prevalence of nodular autonomy usually results in a further increase in the prevalence of hyperthyroidism if iodine intake is subsequently increased by salt iodisation.

Epidemiological studies have demonstrated that reduced iodine intake during pregnancy leads to goitrogenesis, lower free T4 concentrations and increased serum TSH.

The prevalence of hypothyroidism in the developed world is about 4-5%. The prevalence of subclinical hypothyroidism in the developed world is about 4-15%.

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Table 1. The spectrum of iodine deficiency disorders.

Fetus	Abortions
	Stillbirths
	Congenital anomalies
	Increased perinatal mortality
	Endemic delayed motor and mental development
Neonate	Neonatal goitre
	Neonatal hypothyroidism
	Endemic mental retardation
	Increased susceptibility of the thyroid gland to nuclear radiation
Child and adolescent	Goitre
	(Subclinical) hypothyroidism
	Impaired mental function
	Retarded physical development
	Increased susceptibility of the thyroid gland to nuclear radiation
Adult	Goitre with its complications
	Hypothyroidism
	Impaired mental function
	Spontaneous hyperthyroidism in the elderly
	Iodine-induced hyperthyroidism
	Increased susceptibility of the thyroid gland to nuclear radiation

CLASSIFICATION OF HYPERTHYROIDISM:

CONDITION	TSH LEVEL	THYROID HORMONES	COMMENTS
Hyperthyroidism	<0.1mlU/L or undetectable	Elevated T3orT4	
Hypothyroidism	>4.5mlU/L	Low T4	
Subclinical hyperthyroidism	<0.1 to 0.4 mlU/L 0.1 TO 0.4 mlU/L	Normal T3 and T4 Normal T3 and T4	Clearly low serum TSH Low but detectable
Subclinical hypothyroidism	4.5 to 10 mlU/L ≥10mlU/L	Normal T4 Normal T4	Mildly elevated TSH Markedly elevated TSH

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1. HYPERTHYROIDISM:

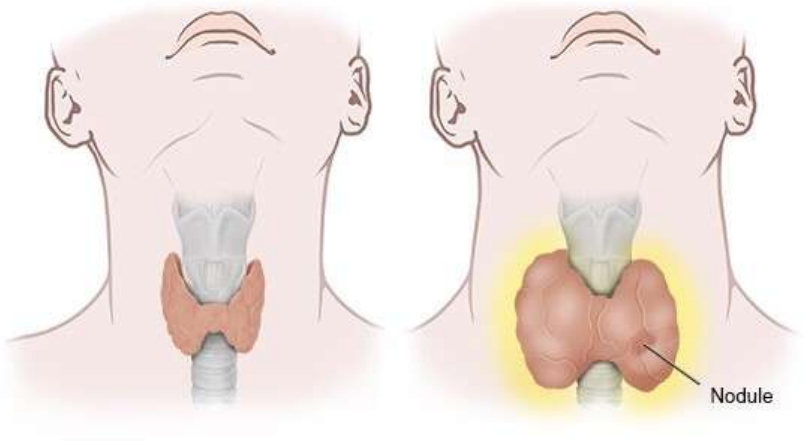
DEFINITION:

Hyperthyroidism happens when the thyroid gland makes too much thyroid hormone. This condition also is called overactive thyroid. Hyperthyroidism speeds up the body's metabolism. That can cause many symptoms, such as weight loss, hand tremors, and rapid or irregular heartbeat.

- The thyroid gland is one of the endocrine (hormone) glands in the body. These glands make hormones to regulate many different functions in the body. An overactive thyroid produces too many hormones. This problem is also known as hyperthyroidism. The most common cause is Graves' disease.
- If too many hormones are made, the body's metabolism goes into overdrive. This can lead to noticeable symptoms such as weight loss, sweating, nervousness or a rapid heartbeat. An overactive thyroid also increases the risk of cardiovascular disease (problems affecting the heart and/or blood vessels).
- If the thyroid gland doesn't produce enough hormones, the body's metabolism slows down.

Symptoms

- Irregular heartbeat
- Weight loss
- Anxiety
- Diarrhoea
- Loss of appetite
- Weakness or tiredness
- Irritability, trembling, trouble sleeping
- If it is graves' disease the patient may develop bulging eyes and blurred vision



Complications:

- graves ophthalmopathy
- thyrotoxicosis (thyroid strom)
- heart problems like atrial fibrillation, congestive heart failure
- brittle bones
- vision problems

2. HYPOTHYROIDISM:

Definition: Hyperthyroidism is when your thyroid gland doesn't make and release enough hormone into bloodstream. The condition slows down your metabolism which make you gain weight unexpectedly or feel tired all the time. Harmone replacement therapy is the most common treatment for an unactive thyroid.

Types of Hyperthyroidism:

1. Primary
2. Secondary
3. Tertiary
4. Subclinical hyperthyroidism

- Hypothyroidism results from low levels of thyroid hormone with varied aetiology and manifestations. Hypothyroidism is primarily categorized as primary and secondary (i.e., central) hypothyroidism.
- In primary hypothyroidism, the thyroid gland cannot produce adequate thyroid hormone. The less commonly seen secondary or central hypothyroidism occurs when the thyroid gland functions normally; however, hypothyroidism results from the abnormal pituitary gland or hypothalamus function.

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- The most prevalent aetiology of primary hypothyroidism is an iodine deficiency in iodine-deficient geographic areas worldwide. Autoimmune thyroid diseases are the leading causes of hypothyroidism in the iodine-sufficient regions.
- The most common cause of hypothyroidism is chronic autoimmune thyroiditis (Hashimoto's thyroiditis) common causes of hypothyroidism include:
- Medications including amiodarone, thalidomide, oral tyrosine kinase inhibitors (e.g., sunitinib, imatinib), stavudine, interferon, bexarotene, perchlorate, rifampin, ethionamide, phenobarbital, phenytoin, carbamazepine, interleukin-2, and lithium.
- Thyroid surgery
- Radiotherapy of the head or neck area
- The use of immune checkpoint inhibitors (e.g., anti-CTLA-4 and anti-PD-L1/PD-1 therapy) has been associated with both primary and secondary hypothyroidism.

Symptoms:

- Fatigue
- Lethargy
- Cold
- Weight gain
- Constipation
- Voice change
- Dry skin
- But the clinical presentations may include wide variety of symptoms that differ with age, sex and time between onset and diagnosis.

COMPLICATIONS:

With treatment hyperthyroidism complications aren't very common. But left untreated, an underactive thyroid can lead to other health conditions like:

a) Goitre
b) Infertility
c) Miscarriage of birth
d) Heart issues
e) Peripheral neuropathy
f) Myxoedema coma (a rare complication that can affect multiple organ damage)

MANAGEMENT:

- ✓ Treatment of hyperthyroidism depends on the underlying aetiology and can be divided into symptomatic and definitive therapy.
- ✓ The symptoms of hyperthyroidism, such as palpitations, anxiety, and tremors, can be controlled with a beta-adrenergic antagonist such as atenolol.
- ✓ Calcium channel blockers, such as verapamil, can be used as second-line therapy for patients who are beta-blocker intolerant or have contraindications to beta-blocker treatment.

ANTITHYROID DRUGS:

The choice of treatment modality for hyperthyroidism caused by overproduction of thyroid hormones depends on the patient's age, symptoms, comorbidities, and preference.

Thionamide drugs-

i. Methimazole
ii. carbimazole (precursor of methimazole)
iii. Propylthiouracil

These drugs are competitive inhibitors of the thyroid peroxidase (TPO) enzyme, resulting in their ability to block thyroid hormone synthesis.

Thionamide therapy has no permanent effect on thyroid function, and recurrence of hyperthyroidism is common in patients who discontinue thionamide therapy.

- Doses:
  - ATA (Americal Thyroid Association) guidelines provide a rough guide for the initial dose of methimazole based on free T4 levels
  - Free T4 1-1.5 times upper limit of normal: Start methimazole 5-10 mg daily
  - Free T4 1.5-2.0 times the upper limit of normal: Start methimazole 10-20 mg daily
  - Free T4 2.0-3.0 times the upper limit of normal: Start methimazole 30-40 mg daily

Treatment with anti-thyroid medicine typically lasts 12 to 18 months.

RADIOIACTIVE IODINE THERAPY:

- The thyroid gland takes up radioiodine. This treatment causes the gland to shrink.
- Patients who have contraindications for the use of thionamides should also undergo RAI. This procedure should be avoided in patients planning a pregnancy in the six months due to the risk of inducing hypothyroidism in the foetus. RAI is also contraindicated in lactating women.
- Thyroid function should be monitored 1–2 months after radioactive iodine therapy. Some suggest measuring free T_4 no more than 6 weeks after radioactive iodine therapy, to

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detect hypothyroidism, especially in patients at risk for developing or worsening Graves' orbitopathy.

- Subsequent monitoring is important because some patients given radioactive iodine might have transient hypothyroidism, followed by relapse of hyperthyroidism.
- Patients with relapse or persistent hyperthyroidism after 6 months can be given radioactive iodine again.
- Side effects of radioactive iodine therapy - Acute thyroiditis, cerebrovascular and cardiovascular disease.

Most people who receive this treatment must take thyroid hormone medication (LEVOTHYROXINE) for the rests of their lives to maintain normal thyroid hormone levels.

BETA BLOCKERS:

They help ease symptoms like tremors, rapid heartbeat, and heart palpitations. It is used until the hormone levels come back to normal.
Atenolol, Propranolol, Metaprolol similarly cause minimal reduction in serum T3 concentration.

LEVOTHYROXINE:

Treatment for hypothyroidism usually includes taking the thyroid hormone levothyroxine everyday. It returns hormones levels to a healthy range, eliminating symptoms of hypothyroidism.

Levothyroxine is a reliable and commonly prescribed drug to treat thyroid disease, but excessive dosage may have adverse effects.In patients with hypothyroidism, levothyroxine is used as replacement therapy.

For most patients, therapy can be initiated with a full replacement dosage (1.6 micrograms/kg body weight), which is usually 75 to 100 micrograms/day for women and 100 to 150 micrograms/d for men.

SURGERY:

Patients who experience significant adverse effects with the use of thionamides, when thyroid malignancy is suspected, presence of large compressive goiter, and the presence of co-existing hyperparathyroidism needing surgery.

The surgical option should be avoided in patients with significant comorbidities deemed high-risk for undergoing surgery.

THYROIDECTOMY: Here, the thyroid gland is partially or completely removed. The disadvantage is that one has to take Levothyroxine for the rest of their life to supply sufficient amounts of thyroid hormones to the body.

- **Graves' disease**: Near-total or total thyroidectomy is the surgical procedure of choice in patients with Graves' disease, with excellent cure rates. The risk of recurrence or disease persistence with total thyroidectomy is almost 0% versus 8% with sub-total thyroidectomy after five years.
- **Toxic multinodular goitre**: Surgical option of choice is near-total or total thyroidectomy to avoid recurrences.
- **Toxic adenoma**: Preferred surgical option is ipsilateral thyroid lobectomy or isthmectomy, with excellent cure rates and a risk of the treatment failure rate of less than 1%.

After patients undergo near-total or total thyroidectomy, they should be started on weight-based levothyroxine replacement therapy (0.8 mcg/lb or 1.6 mcg/kg).

Lower doses should be used in the elderly, especially in patients with a history of cardiovascular disease or arrhythmia.

LIFE STYLE MODICFICATIONS:

- Take supplements or food rich in vitamin D and calcium
- Reduce the intake of iodine, as it can worsen the symptoms. Even some multivitamins and cough syrup contain a lot of iodine.

Foods to limit with hypothyroidism:

- Soybean flour and cottonseed meal
- Iron and calcium supplements
- Antacids containing aluminum or magnesium
- Some ulcer or cholesterol-lowering drugs
- Walnuts

Overall, it is most important for people with hypothyroidism to eat a well-balanced diet, rather than consuming any particular food.